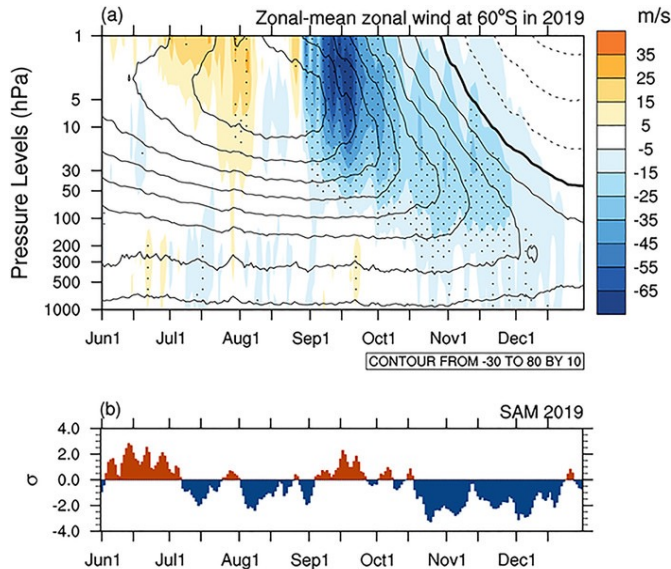


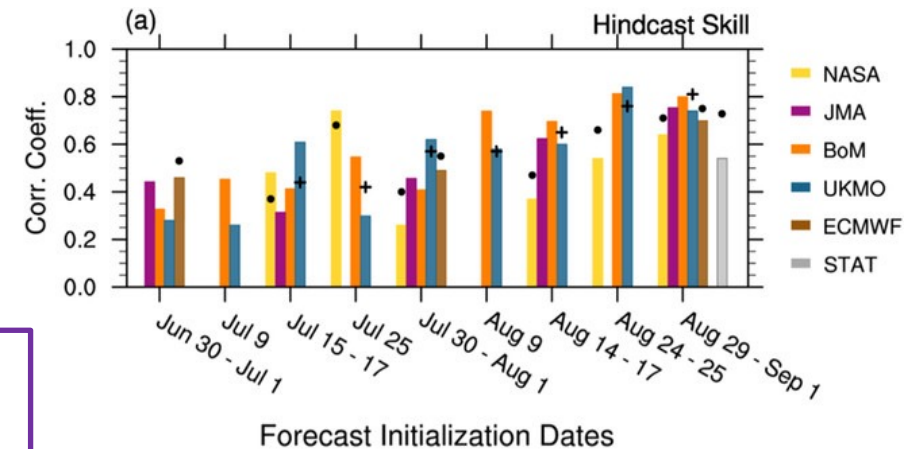
The 2019 Southern Hemisphere stratospheric polar vortex weakening and its impacts

A rare Southern Hemisphere (SH) stratospheric warming occurred in austral spring 2019 promoting a record strong swing of the Southern Annular Mode (SAM) to its negative phase for the season. The resulting record negative SAM was the primary driver of the extreme hot and dry conditions over subtropical eastern Australia in late spring 2019 that, in turn, were conducive for the severe wildfires that occurred at that time. Using a suite of global analysis and forecasts this study examines the structure, evolution, and predictability of the stratospheric warming and following events. Improved understanding of interactions between the stratosphere and weather can lead to improved seasonal and climate forecasts.



Stratospheric wind anomaly descends into the troposphere changing the SAM index.

The skillful prediction of the 2019 springtime stratospheric vortex weakening resulted in the skillful prediction of the late spring negative SAM, whose strength was tied to the strength of hot and dry forecasts over eastern Australia for late spring.



Prediction of Sep-Oct-Nov stratospheric winds from different initial dates for 5 forecast systems, including the NASA GEOS-S2S.

Lim, E.-P., H. H. Hendon, A. H. Butler, D. W. J. Thompson, Z. Lawrence, A. A. Scaife, T. G. Shepherd, I. Polichtchouk, H. Nakamura, C. Kobayashi, R. Comer, L. Coy, A. Dowdy, R. D. Garreaud, P. A. Newman, and G. Wang, 2021. **The 2019 Southern Hemisphere stratospheric polar vortex weakening and its impacts.** *Bull. Amer. Meteor. Soc.*, **120**, 6, E1150-E1171. doi: 10.1175/BAMS-D-20-0112.1